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STUDENT PERCEPTIONS OF DIGITAL TEXTBOOKS  
IN A COLLEGE NURSING PROGRAM

by

Alan Douglas Eno

A THESIS

Presented to the Faculty of  
The Graduate College at the University of Nebraska  
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STUDENT PERCEPTIONS OF DIGITAL TEXTBOOKS  
IN A COLLEGE NURSING PROGRAM

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University of Nebraska, 2010

Adviser: Amy Struthers

The purpose of this research was to study the use of digital textbooks in a small liberal arts college. The research was a mixed methods descriptive study using a pre and post survey to determine student perceptions of the technology. Findings indicated that students needed training in the installation and use of digital textbooks. Findings also indicated the need for further research into what students understand about using digital textbooks. Recommendations are for the college to institute training sessions to teach students how to use the digital textbooks.



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## **Introduction**

“All media is going digital.” Steve Ballmer, chief executive of Microsoft®, who has worked for the software giant since 1980, made this profound statement at the 56<sup>th</sup> Cannes Lions International Advertising Festival (World Advertising, 2009).

In his acceptance speech for the Media Person of the Year Award, Ballmer stated, “This is a time of sweeping innovation and transformation in advertising and publishing and there are incredible opportunities to use technology to deliver more value to both advertisers and consumers” (World Advertising, 2009; Exchange4media.com, 2009, March 31).

Steve Ballmer seemed to be looking in the right direction. All forms of media currently in use—print, sound recording, cinema, radio, television, Internet and mobile—show indications of switching to digital formats. Some, like the Internet, started out digital (Stovall, 2009).

The thought “all media is going digital” can be exciting to some, but overwhelming to others. The pervasiveness of digital adoption extends even to President Barak Obama, who had to negotiate with the Secret Service to keep his Blackberry upon entering office. While in the President’s case, the issue was one of security, it does illustrate the extent to which digital technology has saturated so many aspects of life (Stovall, 2009).

In the educational arena, text and reference books are a part of the print mass medium that is transitioning toward digital technology. This research explores the expansion of some of the major mass media into digital formats, specifically focusing on the use of digital textbooks in a classroom setting to discover student perceptions of changes in

textbook technology. This research will explore the question of whether students think the technology will improve their learning. The study will also explore changes in student perceptions after having the chance to use the technology, whether students modify their study habits and grades as a result of the digital textbooks and whether the students show interest in expanding the use of digital textbooks into other classes.

### **The Digital Evolution**

#### **Radio**

The audio recording industry was one of the first to adopt digital technology for its products. After years of development, the music industry embraced a digital format with the introduction of the Compact Disc (CD). Sony and Philips collaborated on and officially released the CD on August 17, 1982. Beginning in March of 1983, the CD was marketed as a digital alternative to analog tapes and 8-track tapes in the United States (Smith, 2007).

Attempts have been made in multiple countries to switch to digital radio broadcasts that provide better audio quality, but success has been elusive. Development of digital radio broadcast technology began in Europe in the mid 1980s. Labeled “DAB” (Digital Audio Broadcasting), the European Eureka 147 project became the “most developed system of digital terrestrial radio” (Lax, 2003, p. 328).

Canada was an early adopter of Eureka 147, but digital technology did not enjoy the success that it had in other media. Between 1995 and 2005, competing interests and the influence of the U.S. radio market worked to derail Canada’s attempts to replace analog



AM and FM broadcasting. The future of digital radio in Canada remained undetermined (O'Neill, 2007).

In the European radio market, the Digital Radio Mondiale Consortium (DRMC) decided in 2005 to increase digital broadcasts of AM radio frequencies. However, one of the difficulties of digital radio is that a receiver must be compatible with the signal. Blaupunkt and Sony Corporation were unwilling to develop radio receivers compatible with the Digital Radio Mondiale, which severely hindered the advance of digital radio in Europe and in the absence of a solid market, some countries like Sweden and Switzerland have cut digital radio services (Dumiak, 2006; Lax, 2003).

In the United States, two digital satellite radio companies were launched in 2002: XM and Sirius. These were never intended to replace analog radio broadcasting and constitute a comparatively small portion of the nationwide radio audience (Lax, 2003). Despite the stated intent of satellite radio companies, in 2002, analysts predicted that by 2010, satellite radio would have more than 40 million subscribers and would have a profound effect on "AM/FM radio listening and revenue" (Ho, 2010).

But by 2008, XM and Sirius were only serving 19 million subscribers and were obliged to combine forces. In 2009 Sirius XM was on the brink of bankruptcy. Ho (2010) credits the slow progress of satellite radio broadcasting to the development of more current digital audio formats: the iPod, iPhone and Internet music providers like last.FM and Pandora.

Online radio had an estimated 69 million listeners in 2009. However, that apparently did not take much of the listening audience away from analog AM/FM stations. In 2009,

92 percent of Americans over 12 years of age indicated they used analog radio on a weekly basis and eight out of 10 said they would continue to do so (Arbitron, 2009).

If anything, HD radio had a more adverse affect on AM/FM radio stations in the United States than either satellite or online radio. HD radio was a little known digital radio format introduced in 2004. This format was supposed to enable radio stations to transmit digital signals with improved audio quality (Arbitron, 2009; Strom, 2009).

But problems similar to those that plagued the European DRMC kept the HD Radio format from gaining popularity. Five years after HD radio's introduction only 100 compatible receivers were on the market and none of them were cheaper than \$79. This limited selection and availability along with other issues relating to financial priorities doomed the format and interest in HD Radio has remained stagnant since 2007 (Pegoraro, 2009; Strom, 2009).

Digital audio players such as the iPod and the iPhone may be affecting the radio market the most. Arbitron (2009) reported in 2009 that more than four out of 10 Americans owned a portable MP3 player and that most Americans aged 12 to 34 owned one. More than 25 percent of Americans have purchased music online. The study concluded that this produced only a moderately negative effect on AM/FM listening audiences.

Reports and data regarding digital versus analog radio did not agree in all aspects. Arbitron's 2009 study reported that 92 percent of Americans actively used AM/FM radio. Ho (2010) cited a significant drop in radio audiences since 2000 and said that local radio had lost 20 percent of its listening audience and 30 percent of its revenue due to the rise

of the iPod and Internet radio stations. Ho added that radio revenues fell more than 18 percent during 2009.

Strom (2009) took an even more pessimistic perspective and predicted that the failure of HD Radio would lead to the eventual bankruptcy and “stunting of the industry itself” (para. 2).

Nearly a third of Americans expressed an interest in having more choices for music and radio content in their vehicles. This would mean use of Internet radio on a device like the iPhone or a broadband connection directly in the vehicle’s dashboard. Both options are being explored and may become digital alternatives to AM/FM radio that in the future, could jeopardize the longevity of analog and satellite radio (Arbitron, 2009; Ho, 2010).

The 2009 Arbitron study also explored interest in mobile media, finding that many people wanted radio and music corporations to make their products and services available for the mobile market. Studies indicated that the “broad usage and impact of mobile phones suggests that they are the next frontier for media opportunities” (Arbitron, 2009).

### **Television**

Television is the most recent major mass media source to make a massive switch to digital. In 1996, the U.S. Congress allotted sections of the digital broadcast spectrum for each television station. The federal government mandated that all television stations begin broadcasting only digital signals and stop broadcasting an analog signal by June 12, 2009. This freed up sections of the broadcast spectrum for emergency communications (What is DTV?, 2009).

The new digital signals offered viewers a sharper picture, better sound quality and improved the efficiency of the broadcasting signals. This efficiency allowed for multicasting: a process where several channels may be broadcast along the “same amount of spectrum required for one analog program” (What is DTV?, 2009).

### **Print Media**

Newspapers began putting content online in the mid 1990s, making a gradual transition to digital until 2,859 newspapers around the globe were represented online by 1998. “The newspaper industry has embraced the Internet as a possible outlet to maintain, if not increase, its base of readers and advertisers” (Peng, Tham, & Xiaoming, 1999, p. 53).

In November 2005, Nielsen released a report about online newspaper growth. According to the research, one in four Internet users accessed newspaper websites. The report also counted 39,283 U.S. and internationally based newspaper websites (Online newspapers, 2005).

In 2010, websites such as [www.onlinenewspapers.com](http://www.onlinenewspapers.com), [www.newspapers24.com](http://www.newspapers24.com) and [www.newspapers.com](http://www.newspapers.com) exist solely to link users to tens of thousands of newspaper sites around the world. The exact number of online newspaper sites was not available, but each linking site claimed well above 20,000 links. A Web site named *The Paperboy* claimed to link to 6371 local newspaper websites ([www.thepaperboy.com](http://www.thepaperboy.com)).

While the Internet offers advantages to newspaper companies, the entrance of digital technology into the media changed the foundational processes of newspaper production. Writing switched from a typewriter to Microsoft® Word®. Photography darkrooms gave

way to digital cameras and Adobe® Photoshop®. Page design and layout moved from paper cutouts and paste-ups to digital desktop publishing programs like Adobe® InDesign®.

Proofing systems improved as well, allowing editors to digitally validate a layout without going through the process of printing it. Printing technology advances like Presstek's® chemistry free Computer to Plate (CTP) systems and KonicaMinolta's® digital printing units streamline the newspaper printing process. Although current evidence does not support the idea, Morton (1998) theorized the advancing digital technology that encouraged newspapers to adapt their delivery methods would give them an even stronger hold on local news and data.

### **Sound Recording**

The introduction of the audio book set off a chain of events that continue in 2010. In 1973, Duval Hecht envisioned a new way to read while he was commuting to work. He started a company called Books on Tape that loaned commuters recordings of books. These recordings became known as talking books, or audiobooks. Thus “the audiobook industry was born in traffic” (Whitten, 2002, p. 3).

Talking books had existed at least in theory before Hecht, dating back to Thomas Edison's 1888 prediction of possible uses for his sound recording device (Camlot, 2003). By the 1970s, companies were using voice recordings for archiving poetic and written works, creating aids for the visually impaired and for children's entertainment (Whitten, 2002).

In 1952, Caedmon Records recorded its first audio book on LP, *A Child's Christmas in Wales*, by Dylan Thomas. The company's founders, Barbara Cohen Holdridge and Marianne Roney Mantell, subsequently recorded hundreds more of the new talking books. At the same time, the American Foundation for the Blind and the Library of Congress Talking Books program worked to create audiobooks for the visually impaired. The Library of Congress still provides services to blind and visually impaired persons (Whitten, 2002).

During the 1970s, the music industry's use of audiocassettes had prompted automakers to install analog tape decks in most new vehicles. This paved the way for Duval Hecht's company and several others to produce and market audiobooks on cassette that covered a wide variety of topics. Book publisher Simon & Schuster initiated its audio division in 1986 and shortly thereafter, many leading book publishers followed suit (Whitten, 2002).

When compact discs entered the music market, book publishing companies already producing and selling audiobooks on cassette adopted the new digital format and began marketing both digital and analog audiobooks. Libraries led the charge in the digital audiobook market in response to high consumer demand. Companies tested alternative digital formats such as the MP3-CD in order to increase the amount of audio available on a single disc. Whitten (2002) speculated that the future for digital audiobooks would continue to mature.

## **Review of the Literature**

Some in the educational arena believe that digital media will eventually surpass the use of traditional textbooks. “We believe that digital textbooks are the wave of the future” (Goral, 2005, p. 17). This bold statement by Virginia France, the marketing director for the Princeton University Store, was a sentiment that paralleled what Robin Whitten wrote seven years earlier. France went on to temper her statement, saying she wanted students to have options but she did not think digital textbooks would supplant paper books (Goral).

Additional research supports this line of thinking. Discussion on the functionality and appearance of digital textbooks asserts that in the future digital texts will act as one of many important elements of education (Crestani, 2006).

Goral (2005) added that while he would not expect standard paper and ink textbooks to be superseded, the future should show a positive trend for digital textbooks. According to Stovall (2009), only recently have Americans begun to realize the immensity of the digital phenomenon: something that countries such as Japan have been taking advantage of for years.

Some researchers think the time is right and have studied how digital mass media affect student learning. Ugaz & Resnick (2008) researched the use of digital reference books (eBooks) in medical training between 2005 and 2006. They found when medical reference eBooks were made available from the publishers, the digital format was more frequently used than the print format by a 12,132 to 278 ratio. This indicated the need for continued growth in the number and variety of texts made available digitally.

Some studies took a broader view of digital technology in the classroom, looking to understand the impact of digital media on students. While initial reactions were positive, the research has yet to determine just how effective the technology can be on student learning potential (Trei, 2006).

Digital textbooks have been available to educational institutions for years. At the end of 2000, the MetaText division of netLibrary and Houghton Mifflin, two major publishers in the textbook industry, stated their intent to produce electronic textbooks for higher education and make the books available for the following school year. Both were to include the ability to “search, navigate, annotate, highlight and bookmark” (Netlibrary & Thomson, 2001, p. 3; Hane, 2001, p. 31).

The demand for a suitable platform on which to create digital textbooks sparked many technological innovations. Sony Corp. and Amazon.com were the first to produce effective platforms for the new digital book, followed extremely recently by Apple (Ganapati, 2009; Hall, 2009; The iPad, 2010).

Sony’s Reader debuted in 2006. The Reader had a grayscale 600 by 800 pixel touch-screen display and connected via USB to a PC for downloading books. The internal memory supported about 350 books but could be supplemented with SDHC or Sony Memory Stick cards (Ganapati, 2009).

Amazon introduced its eBook reader in November 2007. Named the Kindle, the device consisted of a black and white LCD screen, a high-speed wireless broadband connection known as an EV-DO (Evolution, Data Optimized) and a keyboard. Users could choose from some 90,000 books in Amazon’s collection and download them to the



internal drive. One year later an estimated 540,000 Kindle devices had been sold (Hall, 2009).

In May 2009, Amazon announced the latest model of its Kindle Reader, refining the physical design as well as the internal structure. The second generation, known as Kindle 2, relies on Sprint's EV-DO network for eBook downloads. The Kindle 2 has 2GB of internal memory, which can store up to 1500 books. It also features a text-to-speech engine that allows a user to use the device like an audiobook (Ganapati, 2009).

When Apple announced the debut of its newest gadget, the iPad, in January 2010, it was immediately compared to both the Sony Reader and the Kindle 2 for its eBook reading potential. One of the iPad's supposed functions is to serve as a more advanced hardware platform for eBooks (The iPad, 2010).

The Apple iPad uses a backlit touch screen, which sets it apart from its competitors. Some appreciate this difference, while others claim to have significant trouble and eyestrain when reading from a backlit screen (The iPad, 2010). At the writing of this paper, the iPad had not yet begun shipping to stores so it was too soon to determine actual data on which hardware platform would be most effective for eBook reading.

While praises abound for eBook reader devices, some educators and researchers have raised concerns about the electronic textbooks. Foremost among these concerns is the issue of protecting copyright and intellectual property (Nelson, 2008). A variety of methods have been implemented to satisfy those concerned. Some early digital texts were encoded with Digital Rights Management (DRM) technology to protect copyrights.

Others had a limited time frame for use. Critics scorned the fact that textbook activation would typically expire after five months, rendering the texts useless (Goral, 2005).

Jeffrey Young interviewed skeptics of Amazon's Kindle, who pointed out the \$489 price tag as being a financial deterrent to students. The skeptics also debated over the added inconvenience of carrying an additional electronic device because the laptop has become so much of an educational mainstay that more than 80 percent of college students now own one. The idea that the electronic device would replace heavy textbooks was not discussed (2009). Research indicated however, that printing options and a screen reading feature might increase the appeal of digital textbooks to students (Jamali, Nicholas, & Rowlands, 2009).

Because the rate of use and implementation of digital textbooks in the academic arena has remained low, some researchers, including Young, view the slow acceptance and limited adoption as failure. That failure may stem from lack of interest on part of schools or faculty, or simply lack of knowledge about the available technology. Many professors are unaware of programs like CourseSmart, which was established in 2007 and currently provides more than 6,300 digital textbooks from 12 publishers. The question must be asked how devices such as the Kindle or the iPad will succeed in the educational arena when previous electronic-textbook tests have failed (Young, 2009).

In 2001, the California State University conducted an eBook pilot project over the course of a year. The school made eBooks available in its libraries and studied how the introduction of the technology into the learning environment was accepted and used.

While the results were mildly positive, the study did little to encourage wider implementation of eBook technology in the university's classes (Langston, 2003).

Auburn University measured usage of digital books in its Montgomery Library from 2000 to 2004 and reported a 22 percent increase in the use of digital books over a decrease in the use of traditional printed books. The research indicated that certain school subjects are more suited for use with eBooks. Business, literature, general social sciences, medicine, and computers were ranked as the top five subjects well suited for electronic textbook use. Subjects ranked at the bottom of the study were sociology, anthropology, chemistry and the general and earth sciences (Bailey, 2006).

The "first large scale effort to make electronic textbooks available through campus bookstores" was initiated in 2005, when 10 bookstores at colleges in the United States began selling digital versions of certain textbooks. The pilot study was begun by MBS Textbook Exchange Inc., out of Columbia, Mo. It was purposed to gauge reception and gather "market feedback on the level of demand" (Foster, 2005, p. 45). The books available were heavily protected against copyright infringement. They were limited to installation on a single computer, unable to print large portions of the text and expired after a five-month period of time. The study determined that users did not appreciate the short length of time the books were available after purchase (Foster).

Princeton University was one of the schools involved in the MBS Textbook Exchange Inc. study. In the fall semester of 2009, the university took on another pilot study involving digital textbooks. In this study, Princeton University provided 50 students with Amazon's KindleDX, loaded with digital versions of their textbooks and other class

materials. The purpose of the study was to reduce the university's paper usage (Cliatt, 2010).

In its primary function, the pilot was a success. The school reported a nearly 50 percent reduction in the amount of paper used by students equipped with a Kindle. However, the results also showed dissatisfaction with the technology itself. Students found it difficult to use and "not conducive to academic purposes" (Cliatt, 2010, para. 14). According to secondary results of the study, "e-readers must be significantly improved to have the same value in a teaching environment as traditional paper texts" (Cliatt, para. 1).

Northwest Missouri State University conducted a pilot program using Sony's Reader. Students involved in the study also experienced difficulty adapting to the technology. They reported having problems with turning pages and taking notes on the device and the university determined to use traditional laptops for its future eBook research (Young, 2009).

Despite less than encouraging results, educational institutions continue to conduct research in the area of digital textbooks, looking for the proper combination of hardware and software that will not only appeal to students, but help them improve their study habits and grades. While studies were found exploring the use of devices such as the Kindle and the Sony Reader, there was limited research found specifically on the use of eBooks with a laptop or mini-laptop.

Most of the prior research focused on making the books available through the school's library. While this was a good start, it did leave the decision whether or not to buy the book in digital format up to the student.

The purpose of this research study was to provide evidence for or against further use of the digital textbooks in the nursing program of a small Midwestern liberal arts college. The study also expected to substantiate or suppress the nursing faculty's' desire to expand the use of digital textbooks into additional classes within the program.

The digital textbooks being used in this study include a screen reader function. A screen reader is a type of assistive technology that synthesizes language and speaks aloud what is displayed on a computer screen. The screen reader's primary purpose is for users with impaired vision, but people may find it useful for other applications such as reading while driving a car, or studying for a class. In the case of digital textbooks, the screen reader will read chapters or sections of the book to a student. This may be particularly useful to students who suffer from dyslexia and other reading disorders.

### **Research Questions**

1. When students use a digital textbook with screen reader option on a laptop computer in addition to or in place of traditional paper textbooks, how will students perceive the usefulness of digital textbooks after using the technology for a semester?
2. What changes in student study habits and/or grades will result from the use of the digital textbooks?

### **Theoretical Framework**

In the early 1970s, research into media gratifications explored studies done by Lazarsfeld, Herzog, Suchman, Berelson and Wolfe and Fiske. Those early researchers shared a common method “whereby statements about media functions were elicited from the respondents” (Katz, Blumler, & Gurevitch, 1973, p 509). This research helped to develop Lasswell’s theory that society used media to serve a specific purpose (Katz et al).

Lasswell’s concept of the four functions of media on individuals had originally theorized that media played four roles in society: Surveillance, Correlation, Entertainment and Cultural Transmission. Katz, Blumler and Gurevitch’s (1973) research built on Lasswell’s theory and developed what is commonly known as the Uses and Gratifications Theory. Their research individualized the audiences of mass media, which had been previously regarded as a single passive mass. Results of their research determined that mass media consumers functioned as individuals.

The research done by Katz, Blumler and Gurevitch (1973) focused on how individual society members looked for media using a variety of methods, categorized media in different ways and used media for different purposes. This led to the theory that media consumers use media to fill specific needs, making them goal oriented.

Uses and Gratifications Theory researchers identified three main objectives. First is to explain how media users consume mass communication to satisfy their needs. Second is to discover the reasons why individuals use mass media. Third is to discover the good or bad results of independent media consumption (Katz, Blumler, & Gurevitch, 1973).

This study employs the Uses and Gratifications philosophy as its theoretical framework. Ruggiero (2000) stated that the Uses and Gratifications theory has consistently supported a “cutting-edge theoretical approach” (p. 27) to the introductory period of every new mass medium.

Uses and Gratifications Theory portrays media users taking effective part in the practice of media consumption. The theory also places the needs, motives and gratifications of media users at the focal point of its objectives (Katz et al., 1973).

Ruggiero found that use of “personal computers has been linked to individuals’ motivations to use the Internet” (2000, p. 28). This corresponds to the Uses and Gratifications Theory’s supposition that people will employ media to fulfill some sort of specific need. In the case of college students, the need would be to gain the appropriate knowledge about a subject to pass a class.

The connection between personal computers and motivations to use the Internet supports the notion that a computer’s use may also be linked to motivations to use additional available computerized technology. The example of the technology relevant to this research is the digital book, also referred to as the eBook.

One of the main arguments against the validity of Uses and Gratifications Theory is that people do not always “benefit from the use of media and more important they don’t take on media consumption willingly and independently” (Uses and Gratifications, 2010, para. 8). This is apparent in previous studies involving eBook usage in an educational environment. The impetus to adopt the eBook technology is not generated from the student himself, but from the department or bookstore of the educational institution

interested in adopting the technology. The motivation to use the eBook does not come to the student independently. Also, the motivation for institutions to adopt digital book technology is not always educational as was the case in the 2009 study done by Princeton University (Cliatt, 2010).

One of the weakness of using the Uses and Gratifications Theory for this research is that it deals primarily with use of media for entertainment or escapism purposes. It does, however, address the use of media for information and states, “modern audiences are goal oriented.” The need is filled by either satisfaction, or enjoyment. When a student is studying for a class, his goal is likely to differ from that of a typical mass media consumer seeking entertainment. The theory applies to the student who uses media to gain the knowledge required for passing a class. This ends in satisfaction of that particular goal, not necessarily enjoyment (Uses and Gratifications, 2010).

### **Methodology**

This research was a mixed methods descriptive study of nursing program students at a small Midwestern liberal arts college. In the fall of 2009, Mosby, a publishing branch of Elsevier, began offering digital versions of its nursing textbooks with a screen reading feature. The screen reader was a new addition to Elsevier’s line of digital text and reference books.

Elsevier Publishing’s website provides additional information about the digital textbooks offered by the company. In addition to the screen reader, the digital books offered bookmarking, highlighting, searching, note taking and enhanced navigation features. The digital books were designed to be downloaded from Elsevier’s website and



installed on a laptop computer using a code specific to each book (www.elsevierhealth.com).

The nursing program at a small liberal arts college in the Midwest conducted a trial of new digital versions of Mosby's textbooks. These books were made available to two of its nursing classes. The college required incoming nursing students to own a laptop or mini-laptop to take with them to classes and clinical labs on which they could install the electronic textbook. Prior to the fall 2009 semester, students in the college's nursing program were not given the opportunity to use digital textbooks in conjunction with their nursing classes.

The two classes that were given the opportunity to use eBooks in addition to their paper textbooks became the convenience sample for this study. The researcher made no attempt to ensure this sample was an accurate representation of the general college nursing student population. The participants for this study were chosen because they were enrolled in classes with available digital textbooks. No incentive was given to the students participating in the study.

The convenience sample of college students in this study was from a Fundamentals of Nursing class of 20 students and a Medical/Surgical I (Med/Surg I) class of 18 students. Digital copies of two books—*Medical Surgical Nursing: Patient Centered Collaborative Care* and *2010 Intravenous Medications: A Handbook for Nurses and Health Professionals*—were made available to the Med/Surg I class. Four books—*Nursing Diagnosis Handbook: A guide to planning care* (7<sup>th</sup> ed), *Diagnostic & Laboratory Test Reference* (9<sup>th</sup> ed), *Mosby's 2010 Nursing Drug Reference* and *Mosby's Dictionary of*

*Medicine, Nursing & Health Professions*—were made available in digital format to the Fundamentals of Nursing class.

Data for this research was acquired through the use of survey tools. Two surveys (Appendix A and Appendix B) were prepared to determine the students' perceptions of the digital textbooks. The surveys were reviewed for validity and focus. They were then submitted for review and approval of the Institutional Review Board. The surveys were initially administered without numbered questions. For this paper, numbers were added to the survey tools to help with locating and associating the question being discussed.

The first survey (Survey A—Appendix A) consisted of 17 questions—15 quantitative and two qualitative—divided into three parts. Part 1 contained two five-point Likert scale questions regarding background information on students' experience with audio books and digital textbooks. This part was included to gain background context on how many of the students had used digital textbooks or audio books before and what their perceptions were.

Part 2 contained questions three through 11. These were five-point Likert scale questions about the digital textbooks. The first three questions asked the students to rate their expectations for the usefulness of the digital textbook, their expectations for the usefulness of the screen reader and their anticipated learning potential for the class due to the use of the technology. The next question asked how much they expected to use the digital book in comparison with the paper book. Questions seven and eight of Part 2 concerned the importance of the digital textbook and screen reader to improving the students' grades in the class.

Question nine asked students to rank digital textbook features on a scale of one to five. The last two questions of Part 2 regarded whether the students thought the technology would change the way they studied and whether they would like to use digital textbooks for other classes.

Part 3 of Survey A consisted of six demographic questions. In the first four quantitative questions, students were asked to identify what year in college they were, their age range, which textbook using class they were enrolled in for the semester and the type of hardware they were going to use with the digital textbook. In the last two questions of Part 3, students were asked about their mini-laptop use and asked to self identify for the purposes of linking Survey A to Survey B by printing the last four digits of their home phone number.

The second survey (Survey B—Appendix B) consisted of 11 quantitative questions and five qualitative questions designed to follow up the quantitative questions from Survey A. The quantitative questions from Survey A were repeated but worded somewhat differently to the corresponding question from Survey A. This was done to determine a beginning and an end point in order to calculate a change in perception.

Qualitative questions were added to Survey B. The questions' purpose was to provide qualitative insight into the reasons behind student perceptions. Qualitative questions were also to aid in discovering why student perceptions may have changed over the course of the semester. In this way the qualitative responses were used to clarify or enhance the results the quantitative data. They were also helpful in determining possible future directions to take the research.

Survey B was divided into two parts. Part 1 contained nine of the quantitative questions. These questions were follow up corresponding questions to the Part 2 questions on Survey A and were five-point Likert scale questions.

Part 2 of Survey B contained two quantitative demographic questions about year in college and age group. These were duplicated from Part 3 of Survey A. Part 2 of Survey B also included the five qualitative questions. These questions delved more deeply into why students held particular opinions about the digital textbooks. The students were asked why they liked or disliked the textbooks. They were asked how the implementation of the textbooks might have been more helpful to them.

The students were then asked a question about difficulties they encountered when using the digital textbooks and if the textbook had made the class any easier for them. They were asked for any additional comments about the use of the digital textbooks. Finally, the students were asked to print the last four digits of their phone number in order to tie the two surveys together.

An informed consent document advised participants that there was minimal risk to themselves and their personal information and that anyone under the age of 18 was not permitted to partake in the study. The document informed the participants that the college where the research was taking place would have access to the aggregate data collected by the researcher. The participants were also informed of the purpose of the study and possible benefits that might come from it.

Since the research involved two different schools, one where the research was being used and the other where the subjects of the study were enrolled, human subject research

approval had to be gained from both schools. Approval had to be acquired from the Institutional Review Board (IRB) where the research was being used and from the Human Subject Review Board (HSRB) of the college where the subjects of the study were enrolled.

To gain approval of the HSRB, the researcher submitted a thesis proposal, lit review, research questions, plan of study, both survey tools, informed consent document and recruitment script on September 8, 2009. After receiving and fulfilling a request for modification of the informed consent form, approval to proceed was granted by the HSRB September 24, 2009 (Appendix D).

Once the school where the research subjects were enrolled gave its approval, the proposal was submitted to the IRB and the Office of Research Responsibility of the school where the research was to be used. After receiving the application on September 28, 2009, the IRB reviewed the research proposal which included an informed consent form, recruitment script, both survey tools and the HSRB approval form.

The purpose of the IRB review was to ensure the risk to the study's subjects was minimized, the selection of subjects was impartial and the research methods provided adequate safeguard the privacy and confidentiality of all study participants. The research was approved on October 7, 2009, and given exempt status because of the anonymous nature of the surveys. The IRB number was 20091010224 EX, valid for conducting research until May, 2010 (Appendix C).

To strengthen the research, the researcher complete the Collaborative Institute Training Initiative (CITI) Group 2 Social / Behavioral Research Investigators and Key Personnel, Basic Course. The course was completed September 16, 2009.

The surveys were administered in two phases. Survey A was administered to the students during the month of October 2009, prior to their introduction to the digital textbook. The first survey for Med/Surg I was administered on October 12, 2009 and the first Fundamentals of Nursing survey was administered on October 14, 2009.

For Survey A, the researcher met with the classes, informed the students of the methods and purpose of the study and administered the surveys. Students who agreed to participate in the study read, dated and signed the informed consent prior to filling out the survey. The survey sheets and signed informed consent documents were then placed in a sealed folder until the conclusion of the research.

Survey B was administered in December 2009. Due to scheduling issues and time considerations, the second phase of surveys was administered by the two class instructors, Amy Bollinger MSN, RN, and Debbie Eno MSN, RN. The instructors were given copies of Survey B and the informed consent form and proctored the second survey. The participating students again read, dated and signed the informed consent prior to filling out the survey. The surveys and consent forms were then sealed in envelopes and delivered to the researcher by the class instructors.

Once the data had been collected, the quantitative data was compiled in a Microsoft® Excel® spreadsheet. SPSS Frequencies were run to determine certain initial and final perceptions. Cross tabulations were run comparing corresponding questions from Survey

A to Survey B to determine changes in those perceptions between the first and second surveys. Cross tabulations were also run between a number of questions within each survey to determine whether students with prior experience with digital textbooks responded differently than those with no previous experience.

### Findings

A total of 33 students participated in the study, with a 21 percent ( $n=7$ ) mortality rate. Seven students dropped the class during the semester, did not answer all the questions on the survey or missed the class period in which the final survey was administered.

Of the 33 participants in the study, 58 percent ( $n=19$ ) were enrolled in the Fundamentals of Nursing class and 42 percent ( $n=14$ ) were enrolled in Med/Surg I.

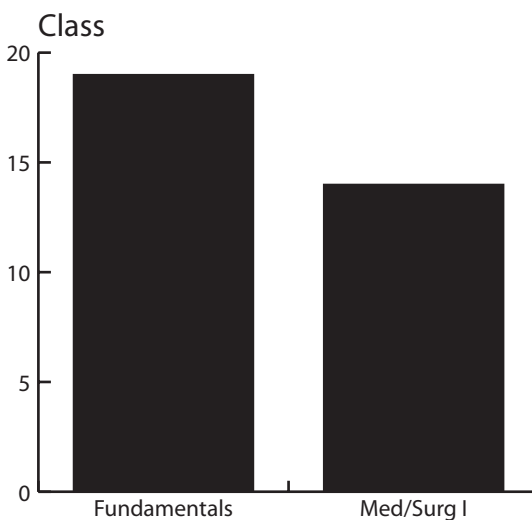


Figure 10.1

Eighty-eight percent ( $n=29$ ) of the students in the study were between the ages of 18 and 24. Twelve percent ( $n=4$ ) were between 25 and 30 years of age. There were no participants outside those age ranges.

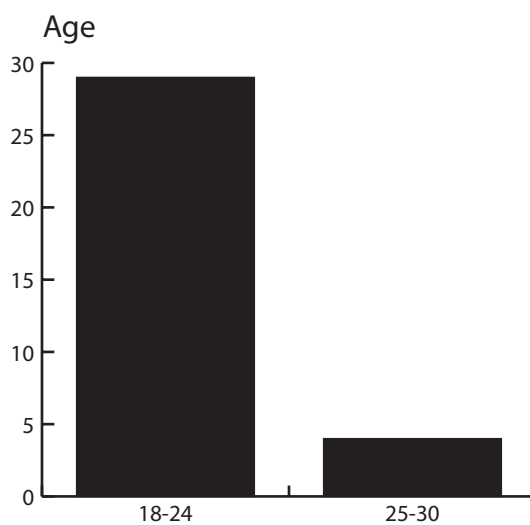


Figure 10.2

Of the study's 33 participants, 36 percent (n=12) identified themselves as college sophomores, 51 percent (n=17) as juniors, 9 percent (n=3) as seniors and 3 percent (n=1) did not identify.

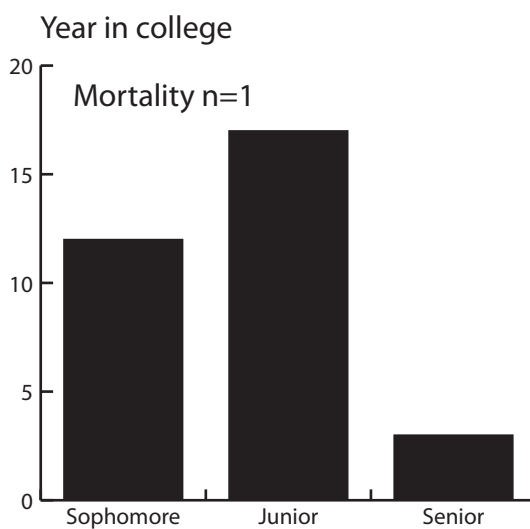


Figure 10.3



The students were asked about previous experience with digital textbooks. Six percent (n=2) reported a poor experience previously with digital textbooks. Thirty-six percent (n=12) reported a good experience and 58 percent (n=19) reported they had never used digital textbooks in the past.

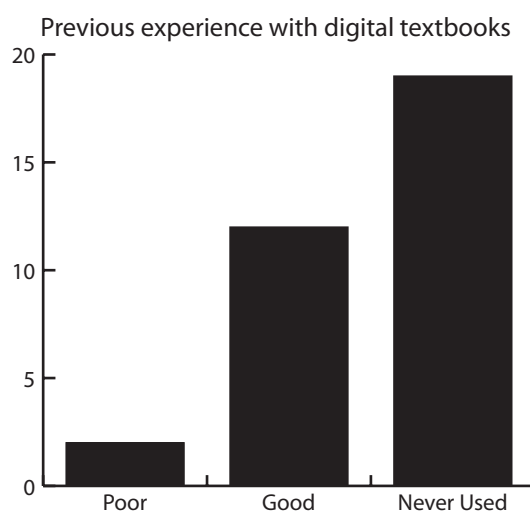


Figure 10.4

Since the technology in the study included an audio screen reader, the participants were also asked about previous experience with audiobooks; 15 percent (n=5) reported a poor experience with audiobooks, 30 percent (n=10) reported a good experience and 55 percent (n=18) reported that they had no prior experience with audio books.

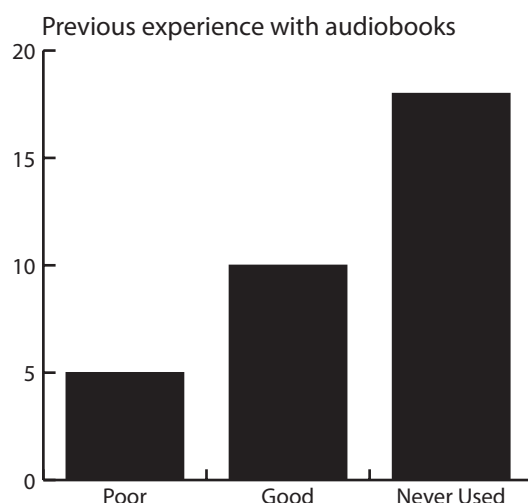


Figure 10.5

Students were asked in Survey A Question A6 what ratio they expected to use the digital textbook to the paper textbook. The results of that question were that 24 percent (n=8) thought they would use the paper text only, 52 percent (n=17) felt they would use mostly the paper text, 18 percent (n=6) thought that they would use the paper text and the digital text about evenly and six percent (n=2) thought they would use mostly the digital text.

At the end of the study, the participants were asked how much they had used the digital textbook versus the paper textbook. Sixty-five percent (n=17) reported using the paper text only, 27 percent (n=7) reported using mostly the paper text and 8 percent (n=2) reported using the paper and digital text about evenly. This indicated that students' initial expectations were to use the digital textbooks. However, data from the second survey showed a trend in which students ended up using the digital textbooks less than anticipated.

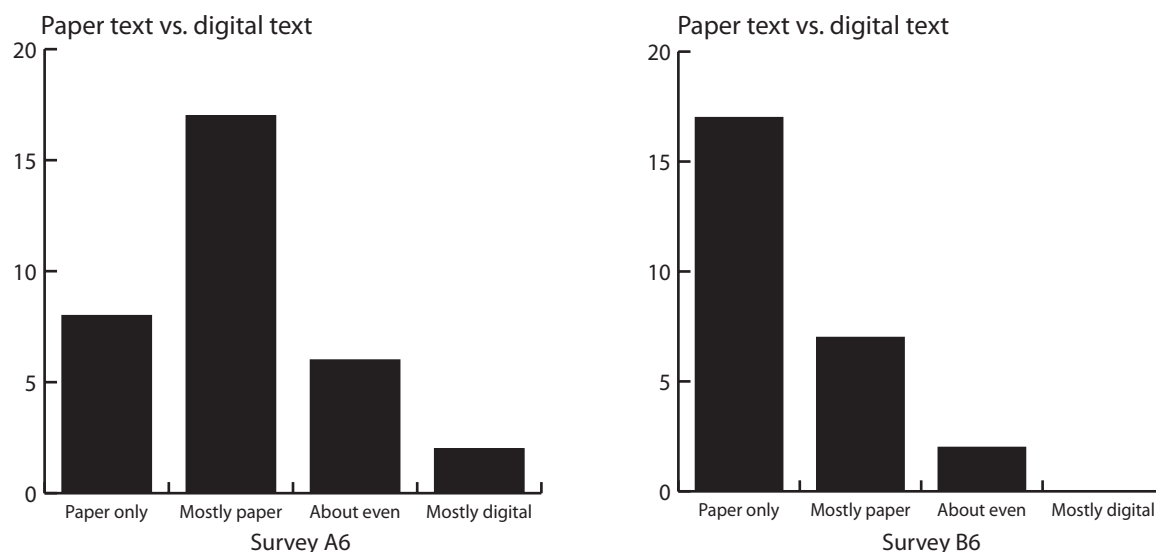


Figure 10.6

Initially, participants were also asked if they would be interested in using digital textbooks for more classes. The students were fairly evenly split between the choices. A total of 45 percent ( $n=15$ ) of the students said yes, they would like to use digital textbooks for other classes; 55 percent ( $n=18$ ) said they would not.

At the end of the study the students were asked whether they would like to continue to use digital textbooks in other classes. A total of 38 percent ( $n=10$ ) said yes, they would like to use digital textbooks for other classes. 62 percent ( $n=16$ ) said no. The differences in answers on the question were attributed partially to the mortality rate and did not appear to accurately represent a decrease in students wishing to use digital textbooks for other classes.

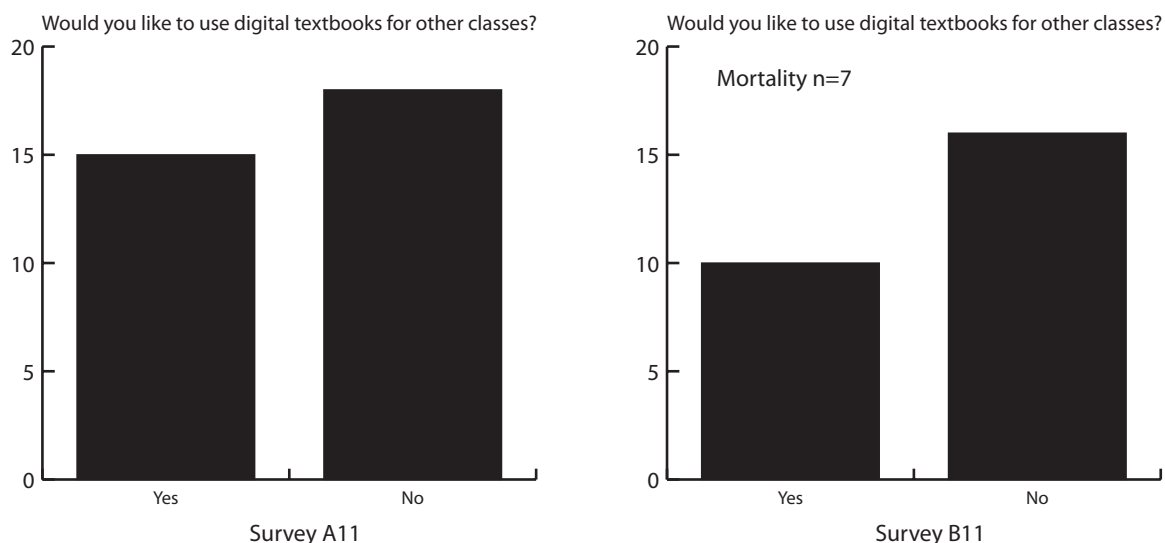


Figure 10.7

One of the biggest shifts in attitude was noted in perceptions of the usefulness of the digital textbook for the class. Students were asked to predict the usefulness of their digital textbooks. Initially the students reported that 3 percent ( $n=1$ ) had very low expectations for the textbook's usefulness, 6 percent ( $n=2$ ) had low expectations, 46 percent ( $n=15$ ) were neutral, 42 percent ( $n=14$ ) were high and 3 percent ( $n=1$ ) had very high expectations.

At the end of the semester, the students were asked how useful their digital textbooks had been. Twenty-seven percent ( $n=7$ ) of the students rated the digital textbooks' usefulness as very low, 12 percent ( $n=3$ ) rated its usefulness as low, 46 percent ( $n=12$ ) were neutral, 15 percent ( $n=4$ ) rated the textbooks' usefulness as high and zero percent ( $n=0$ ) rated the usefulness as very high. A look at the graphs for each survey shows the shift in perceptions about the usefulness of the textbook for the class.

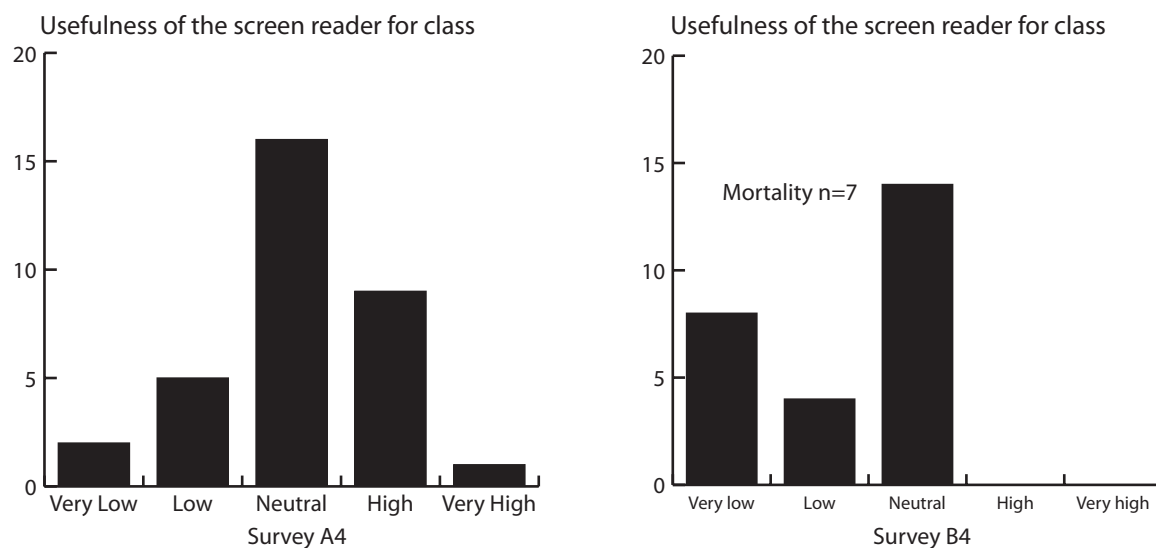


Figure 10.8

Students were asked if the technology would change the way they studied. Initially 58 percent (n=19) said yes, the technology would change the way they studied and 42 percent (n=14) thought the technology would not change the way they studied.

At the end of the semester, the students were asked if the technology had changed their study habits. After using the digital textbooks, 12 percent (n=3) said yes, the technology had changed how they studied, while 88 percent (n=22) said the technology had not changed their study habits.

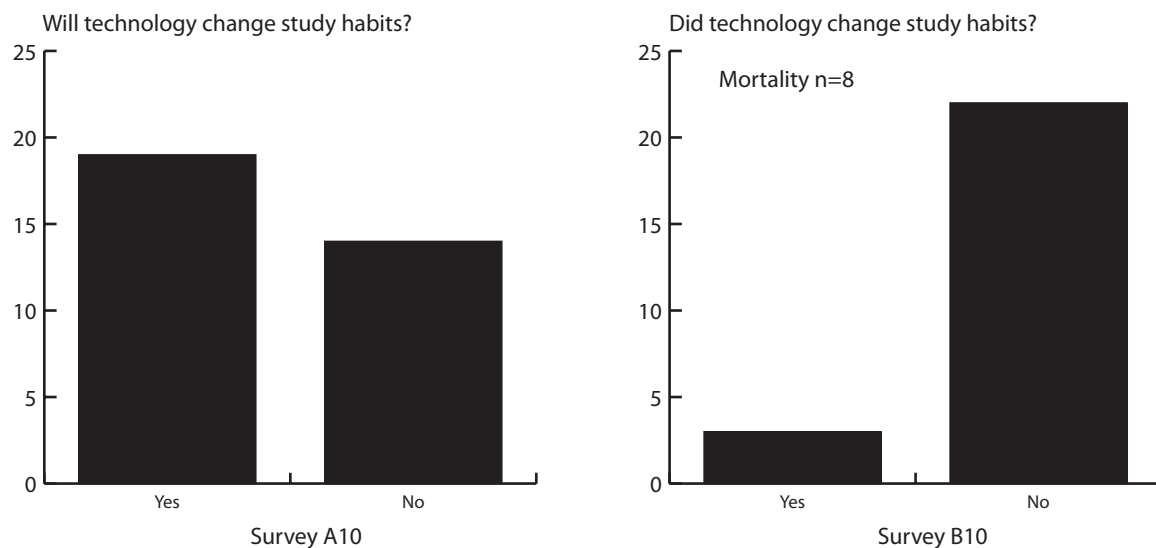


Figure 10.9

The researcher did content analysis on the qualitative data (Appendix E) and discovered seven thought-provoking themes.

Table 10.1

Qualitative themes identified
1. Difficulty using
2. Lack of knowledge
3. Difficulty reading computer screens
4. Search function
5. Course difficulty
6. Unreliable technology
7. Desire for instruction

The number one theme, difficulty using the technology, was identified in questions B17 and B18 and surfaced periodically in other questions. This theme revealed that the students had trouble accessing some of the digital textbook's functions. The students reported difficulty installing the digital textbooks. They reported difficulty running and

using the technology. The students also reported difficulty using some of the digital book's features. One student had hardware compatibility issues, saying, "I didn't really use them because my computer couldn't use the software." Another stated, "I wanted to use it more, but would always become frustrated."

Lack of knowledge was identified in questions B17, and B19. The students reported not knowing how to use the digital textbooks because they received no instruction. One student experienced frustration from the beginning, saying "I kind of had a bad attitude toward it to start with so when I couldn't get it right away, I dropped it"

The students expressed a desire for instruction on effective use of the technology as noted in theme seven. This theme was encountered in question B21, articulated by one student writing, "Teach us how to use it." Another student suggested that in order to succeed, the instructors should "have the students come in, make sure they ALL download it and show [them] how to navigate."

Multiple students expressed frustrations about spending excessive time reading a computer screen. Questions B17 and B19 revealed this theme. Comments such as "I would much rather use paper text - I don't like reading off the computer screens for a long time," and "My eyes got tired easier," identified reading a computer screen as a concern.

Comments about the digital textbook's search function were negative. This theme was identified in question B18, but appeared sporadically in other questions as well. One student said the search feature could have been helpful "for searching for sections/terms [but] this never seemed to work for me though" This ties back to the theme of difficulty

using the technology. Another student simply felt that “the search tool need[s] to be refined.”

The majority (62 percent) of students felt that the technology did not make the class easier. This theme of course difficulty was revealed in question B20. One student thought the digital textbook “would have been a lot more helpful if I had been able to use them.” That student stated “I think that it would have made the class easier. I like the idea of digital textbooks.”

Three students disagreed with the majority. One appreciated that the lighter weight of the digital textbooks “reduced the book load.” Another student appreciated a replacement for the heavy books as well, stating, “I was able to bring my laptop to clinicals instead of a bunch of books.” A third student thoroughly appreciated the technology, answering the question on whether the technology had made the class easier with “Yes, big time.”

Fears about the technology being unreliable were found in answers to question B21. One student wrote, “I feel computer stuff is so shaky I just use textbooks.” Another student responded, “I don't want to always have to carry my computer around.”

### **Discussion**

The quantitative data showed that the students involved in the study did not use the digital textbooks much or perceive advantages in the books' features. The data showed that the students had difficulty installing the digital textbooks and using some of the functions those books included. The data also showed that the digital textbooks did not prompt the students to modify their study habits. The qualitative analysis supports those



findings and gives additional insight into why the students had trouble using the textbooks.

In the qualitative content analysis, one student stood out with positive reactions to the digital textbook. This student expressed appreciation for the lightweight advantage of the digital textbook over the heavy paper books and commented on the digital book helping with the class by being “faster, more efficient, [and] convenient.”

The same student mentioned having difficulty reading, so the screen reader function of the digital textbook was a particularly useful tool. The student ended the qualitative portion of Survey B by stating “I loved it.” The implications of these findings are that the digital textbook and screen reader would greatly benefit students who have difficulty reading, provided they are given proper instruction on how to use the digital textbook.

In the qualitative section of Survey B, several students expressed frustration about not having proper instruction on installing and using the digital textbooks. Some gave up when their initial attempts to use the digital book failed, indicating the need to bridge the knowledge gap about the technology.

The problem of students giving up is supported by the change in the qualitative data between Survey A and Survey B. This is evident in the answers to the question on the ratio of paper to digital book use (Figure 10.6). Initially the students intended or wanted to use the digital textbooks, but problems they encountered along the way made them give up. The students’ good intentions were derailed by lack of knowledge about the digital textbook technology.

As a form of instruction, the digital books used in this particular college included instruction sheets on installing and using the technology. The fact that the students had not used the sheets became apparent. Only one student mentioned keeping the instruction sheet, saying, “my classmates didn't keep instruction handout so they didn't know how to use it. But I loved it.” This indicates that an instruction sheet alone was insufficient for education on the technology's use.

One of the unexpected discussion topics discovered in the findings of the study pertained to knowing what the students think about technology. When the students do not have proper knowledge about how to use a given technology, their opinions do not accurately reflect the broader perception of that technology. For educators, knowing what the students think about technology is more effective when the students know how to use that technology.

The problem of insufficient knowledge was identified in the quantitative analysis for this research as well as the qualitative. Figure 10.6 shows the results of the ratio that the students used the digital text over the paper version. The initial survey indicates the students desire to use the digital books, but over the course of the semester lack of knowledge about using the books discouraged this. By the end of the study, students had not used the digital text as much as they had intended or wanted to.

The problem of students giving up on use of the technology because they do not understand it should be of concern to educators. Most educational institutions wish to implement technology into their programs. If an institution does add technology in a course, instruction on the use of the new technology is a critical element to include.

To avoid the issue of students giving up on technology, future studies could add an intervention at the beginning of the semester. An intervention should concentrate on showing the students how to install and use the digital textbooks. When a student knows how to use a particular technology, gauging how that technology affects the student's study habits, grades and academic performance becomes more meaningful and the chances for improvement in student learning are increased.

The problem of the students' relationship with technology also raises the question of a gap between what the students know and what they are assumed to know by the time they reach the college level. This knowledge gap is another significant discovery of this study that should generate discussion. Do students really know as much as they are assumed to know about technology? When institutions like the one that participated in this study insert digital textbook technology into their classes, care should be taken to instruct students on the proper use of that technology. Institutions should pay special attention to that instruction in order to provide the students with the best tools for learning.

The common assumption that educators seem to make is that students thoroughly understand the technology that underlies and supports educational tools. This may be true in areas such as computer science or engineering. However, when it comes to many other disciplines, students may not understand how to effectively use the technology that they are given.

Students seem to know plenty about social media, the Internet, YouTube, mobile media and superficial communication technologies, but what do they really know about deeper aspects of the technology such as installing and using software or troubleshooting

applications? A question is raised with relevance to this particular study: Is there a significant knowledge gap between having social media or text messaging skills and understanding how to install and access a digital textbook?

Many educational programs would benefit from research into the gap between what educators think college students know about technology and what students actually know. The problem with researching this gap is that what students actually know spans a broad range.

Some students enter the college level knowing virtually nothing about the technology on which digital textbooks are based—or technology in general—while others know a considerable amount. Factors like which high school a student went to or how involved the student was in activities such as yearbook or school newspaper affect a student's technology knowledge level, particularly when it comes to the skills pertinent to mass communication.

Research into not only the knowledge gap but also into the ratio of students who know very little about technology to students who know a lot is critical. This research would aid educators in knowing what skills to teach students in order to bridge the technology gap. It would also benefit academic programs that incorporate technology such as digital textbooks and computer software by providing ideas for how to level the field for students in a given area of study.

Several themes discovered in the qualitative portion of the research indicate areas that an intervention, training or instruction could change to address the issue of lack of

knowledge regarding technology. Also this would then allow for seamless integration of the digital textbook into each class.

Some of the themes will most likely not change, such as a student experiencing difficulty reading a computer screen. If a student has trouble reading from a computer screen, it is unlikely any amount of intervention will change that student's perception of the digital textbooks.

Another non-modifiable theme was course difficulty. While some aspects of learning may become more efficient or effective for certain students, a course may not necessarily be made easier by the use of a digital textbook. The difficulty may be inherent to the course itself, not something that introducing technology could change.

What the technology could change might be situations for students with trouble reading or difficulty comprehending their reading. Access to an alternative resource such as a digital textbook and screen reader may set students with reading impairments on a more even plane with the rest of the class. This may result in those students with reading impairments feeling as though the class were made easier.

One student wrote that the digital textbook technology was "a fantastic way of omitting paper." This perception aligned with the results of the study done by Princeton University using the Kindle DX. The Princeton study was focused on the environmental issue of paper reduction and in this regard that study was a success. Students using Kindles instead of paper reported a more than 50 percent reduction in paper usage over the course of one semester.

The secondary findings of the Princeton study aligned with the findings of this study in that students felt the technology was not optimized for use in education. Students from both studies reported that the technology needed improvement to become viable for educational use. With one student in this study also noting the opportunity to reduce paper usage, findings from the two studies overlapped in a noteworthy manner.

Other research studies also encountered problems with difficulty using the technology. Participants in the Northwest Missouri State University study using the Sony Reader technology reported having difficulty turning pages on the device. One student in this study specifically noted a similar issue, saying, “[it is] just easier to flip through a book rather than click next until I find the right page of the right section.”

The participants also reported that taking notes on the Sony Reader was difficult. While the issues brought up by the Northwest Missouri State study dealt specifically with the Sony Reader device, those issues translate into similar issues that students in this study pointed out, such as problems with the highlighting and book marking features.

One student said that the digital textbook “wouldn’t let me highlight.” This problem ties back to the lack of knowledge theme, reiterating the necessity for proper instruction in the use of the digital textbook technology.

### **Limitations**

The results of this study should be interpreted with caution. The small sample size was the primary reason for many of the weaknesses of this study. As this was a descriptive study, crosstab data was not a required component of the data analysis but a contingency table analysis was run to determine if interesting analytical data could be found. Due to

the small sample size, nothing interesting of statistical significance was discovered in the crosstabs.

The problem of sample size is highly evident as a weakness of the study. A total of 33 students were initially involved in the study, but due to changes in class attendance over the course of the semester, some did not take the second survey. Not having data from both surveys limited the results of the study. As a result of lowered participant numbers, the majority of the crosstabs calculated lower than 0.5 in the Pearson Chi-Square values and lacked statistical significance. Significance in future data collected on this topic would be improved by substantially increasing the size of the sample.

The 21 percent ( $n=7$ ) mortality rate of the study is also a cause for prudence when looking at the findings. Three factors contributed to the mortality rate. The first factor was the fact that some students inevitably drop a class during the semester. During the Fall 2009 semester one student dropped the Fundamentals of Nursing class and two students dropped the Med/Surg I class.

The second factor in the study's mortality was students missing the class in which the second survey (Survey B) was administered. Whether this was due to illness or another reason could not be determined, but it is a concern that should be addressed in subsequent studies on this topic. One possible way to minimize the risk of missing students would be to institute follow-up attempts. Administering the second survey multiple times to intercept students who missed the class in which the survey was initially given may decrease the mortality rate.

The third factor in the study's mortality rate was students leaving blanks on the survey tool. Asking participants to fill out a survey of their own volition creates a risk of error when it comes to descriptive studies. Respondent error is likely to occur when participants are relied on to complete self-administered measurement tools and can result in inaccurate data.

One reason for incomplete surveys in the case of this study is that students may not have understood how to fill in some of the questions. For instance, the question regarding ranking (A9 and B9) of the five features in the digital books was thrown out of the results because some of the study participants did not understand how to answer it. Some students ranked each individual feature on a scale of one to five, writing the same number for several of the options. Other students neglected to rank all of the features and simply put their top ranking on one of the features. Because the participants did not all complete the question as directed, the results of the question were invalid.

One way to improve survey validity would be to scale back the complexity of the survey tools. The results of the surveys might have been more valid had the questions been simplified. Given the small number of participants, possible survey answers could have been condensed, using a 3-point scale instead of a 5-point scale. This would have worked to raise the statistical significance of the data.

When taking the survey, many of the students responded in the middle, resulting in ambiguous results. Whether the students did not want to commit a particular perception, or didn't yet know how they felt could not be determined. To clarify why his answers were neutral, one student wrote "I have no basis in the judgment." This made the results



difficult to analyze because the students seemed more ambivalent about the technology. One way to improve the results might be to remove the neutral category from the survey questions, forcing participants to side one way or another on the issue.

The question wording could also have been simplified and a more careful selection of questions employed. The survey used in this study may have included more questions than necessary. Improvement in the survey tool validity would have come from performing a pilot study to test survey reliability

Additionally, improvement in the mortality rate could be accomplished by offering a stipend or incentive to complete the study. Also, the establishment of credibility and value in the research project is more likely to motivate participants to complete the study.

Using the convenience sample method as opposed to the random sample method of selecting study participants was another of the study's weaknesses because it precluded the results from being generalized to a broad population of college students.

Unfortunately the two classes in the nursing department were the only classes at the school to incorporate digital textbooks and require students to have a laptop, making the convenience sample the only option.

Because the sample's focus was narrow, a number of areas of study that the college offers, such as computer science, communication, religion and the arts were left out of the sample. Had the researcher been able to include all majors at the college, the study would have had more statistical strength and the results could have been generalized.

Also, sampling students from only one liberal arts school leaves out a number of different types of schools, in this case, trade and technical schools that also teach nursing.

Including a wider range of school types would improve the sampling and broaden the applicability of the results for this study.

### **Implications for further research**

One major topic that this research discovered was a technology knowledge gap. The gap between what students know about technology and what educators seem to assume students know about technology is something worthy of additional study. Research into this topic would benefit educational systems by showing educators what technology students are lacking knowledge in and giving teachers a better understanding of which technological support is needed.

The knowledge gained by research on this topic would also benefit students by giving them more access to training and instruction. Students could be taught how to perform tasks such as installing software or using the search feature of a digital book, which may seem basic to some. Teaching these skills will enable the students to take advantage of the technology available for enhancing their academic experience.

Another weakness pointed out in this study was the time period allotted for the research. Replicating this research over a longer period of time would produce more data. Additional data would improve the analysis and provide more statistically significant results. A study of classes over more than a single semester would deliver more significant data and improved results.

One way to expand on this study would be to incorporate a control group of students who only use the paper textbook. Compare the change in their grades to the change in

grades of students using only the digital textbooks. This would complicate the study considerably and possibly change the direction of the study.

Another logical step to take from this research would be to study how students' knowledge of technology contributes to the wealth of knowledge in mass media as a whole.

### **Conclusion**

Several recommendations to educators resulted from this study. This study identified the need for further research into what students really understand about technology. Continuing research will lead to possible practical educational solutions for bridging the technology knowledge gap.

Another recommendation is that knowing what the students think about technology is much more effective when the students know how to use that technology. This research identified a need for instruction when educational institutions employ technology in the classroom. Students may adopt new technology more readily when the instruction is in place to teach them how to use it. When an effective program is in place to educate students on using new technology, the institution is closer to its goal of creating an effective learning environment for the student.

## References

- Arbitron Infinite Dial 2009. (2009). *Arbitron and Edison Research*. Retrieved January 26, 2010, from <http://www.slideshare.net/dkman/arbitron-infinite-dial-2009>
- Bailey, T. P. (2006). Electronic book usage at a master's level I university: a longitudinal study. *Journal of Academic Librarianship*, 32(1). 52-59.
- Camlot, J. (2003). Early talking books. *Book History*, 6, 147-173.
- Crestani, F. (2006). Appearance and functionality of electronic books. *International Journal on Digital Libraries*, 6(2). 192-209.
- Cliatt, C. (2010). Kindle pilot results highlight possibilities for paper reduction. Retrieved February 28, 2010, from <http://www.princeton.edu/main/news/archive/S26/64/38E35/>
- Dumiak, M. (2006). Europe dithers over digital radio. *IEEE Spectrum*, 43(10). 20.
- Elsevier Publishing. Retrieved August 20, 2009, from <http://www.us.elsevierhealth.com/Nursing>.
- Exchange4media.com (2009, March 31). Cannes Lions 2009: Microsoft CEO Steve Ballmer named Media Person of the Year. Retrieved August 25, 2009, from [http://www.exchange4media.com/e4m/news/fullstory.asp?section\\_id=13&news\\_id=34347&tag=29403&search=y](http://www.exchange4media.com/e4m/news/fullstory.asp?section_id=13&news_id=34347&tag=29403&search=y)
- Exchange4media.com (2009, June 25). I don't think we are in a recession; we have reset: Steve Ballmer, CEO, Microsoft. Retrieved August 25, 2009 from [http://www.exchange4media.com/e4m/news/fullstory.asp?section\\_id=13&news\\_id=35100&tag=30636&search=y](http://www.exchange4media.com/e4m/news/fullstory.asp?section_id=13&news_id=35100&tag=30636&search=y)
- Foster, A. L. (2005). In a pilot project, 10 college bookstores begin selling digital textbooks. *Chronicle of Higher Education*, 52(2). 45.
- Ganapati, P. (2009). Showdown: Kindle 2 vs. Sony Reader. Retrieved January 26, 2010, from <http://www.wired.com/gadgetlab/2009/02/showdown-kindle/>
- Goral, T. (2005). Digital textbooks raise concerns. *University Business*, 8(9), 17-17. Retrieved August 25, 2009, from Academic Search Premier database.
- Hall, K. (2009). The history of Amazon's Kindle in one tidy list. Retrieved January 26, 2010, from <http://dvice.com/archives/2009/02/dvice-speed-rea.php>
- Hane, P. J. (2001). Netlibrary, Houghton Mifflin to launch digital textbook initiative. *Information Today*, 18(1), 31.
- Ho, R. (2010, February 19). Sirius XM on a modest comeback but does it matter? [Web log post]. Retrieved February 25, 2010, from [http://blogs.ajc.com/radio-tv-talk/2010/02/19/siriusxm-on-a-modest-comeback-but-does-it-matter/?cxntfid=blogs\\_radio\\_tv\\_talk](http://blogs.ajc.com/radio-tv-talk/2010/02/19/siriusxm-on-a-modest-comeback-but-does-it-matter/?cxntfid=blogs_radio_tv_talk)
- Jamali, H. R., Nicholas, D., & Rowlands, I. (2009). Scholarly e-books: the views of 16,000 academics results from the JISC National E-Book Observatory. *Aslib Proceedings*, 61(1). 33-47.
- Katz, E., Blumler, J., & Gurevitch, M. (1973). Uses and gratifications research. *Public Opinion Quarterly*, 37(4), 509.

- Langston, M. (2003). The California State University e-book pilot project: implications for cooperative collection development. *Library Collections, Acquisitions, & Technical Services*, 27(1). 19-33.
- Lax, S. (2003, September). The prospects for digital radio. *Information, Communication & Society*, 6(3), 326-349.
- Morton, J. (1998). Protecting the local franchise online. *American Journalism Review*, 20(3). 60.
- Nelson, M. R. (2008). Is higher education ready to switch to digital course materials? *Chronicle of Higher Education*, 55(14). A29.
- Netlibrary and Thomson learning from textbook initiative (2001). *Online Libraries & Microcomputers*, 19(1). 3.
- O'Neill, B. (2007). Digital audio broadcasting in Canada: Technology and policy in the transition to digital radio. *Canadian Journal of Communication*, 32(1). 71-90.
- Online newspapers enjoy double-digit year-over-year growth, reaching one out of four Internet users, according to Nielsen//NetRatings. (2005). Retrieved February 20, 2010, from [http://www.nielsen-online.com/pr/pr\\_051115.pdf](http://www.nielsen-online.com/pr/pr_051115.pdf)
- Pegoraro, R. (2009). HD Radio backers claim progress. *The Washington Post*. Retrieved February 20, 2010, from [http://voices.washingtonpost.com/fasterforward/2009/03/hd\\_radio\\_backers\\_claim\\_progres.html](http://voices.washingtonpost.com/fasterforward/2009/03/hd_radio_backers_claim_progres.html)
- Peng, F. Y., Tham, N. I., & Xiaoming, H. (1999). Trends in online newspapers: A look at the US web. *Newspaper Research Journal*, 20(2). 52-64.
- Smith, T. (2007). Compact disc: 25 years old today. Retrieved August 25, 2009, from [http://www.reghardware.co.uk/2007/08/17/ft\\_compact\\_disc/](http://www.reghardware.co.uk/2007/08/17/ft_compact_disc/)
- Stovall, J. (2009, January 25). It's coming – Mobile as the seventh media. [Web log post]. Retrieved August 25, 2009, from <http://jprof.blogspot.com/2009/01/its-coming-mobile-as-seventh-mass-media.html>
- Strom, K. A. (2009, December 16). HD Radio: Doomed from the start. [Web log post]. Retrieved February 20, 2010, from <http://www.kevinalfredstrom.com/2009/12/hd-radio-doomed-from-the-start/>
- The iPad as an eBook reader. (2010, January 29). [Web log post]. Retrieved February 28, 2010, from <http://www.shoppingblog.com/blog/1291010>
- Trei, L. (2006). Researchers study how technology shapes the ways in which students learn. *Stanford Report*. Retrieved August 24, 2009 from <http://news.stanford.edu/news/2006/november15/barron-111506.html>
- Ugaz, G. A., and Resnick, T. (2008). Assessing print and electronic use of reference/core medical textbooks. *Journal of the Medical Library Association*, 96(2). 145-147.
- Uses and Gratifications Theory. (2010). Retrieved March 11, 2010, from [http://www.12manage.com/description\\_blumler\\_katz\\_uses\\_gratifications\\_theory.html](http://www.12manage.com/description_blumler_katz_uses_gratifications_theory.html)
- (n.d.). *What is DTV?*. Retrieved August 25, 2009 from <http://www.dtv.gov/whatisdte.html>
- Whitten, R. (2002). Growth of the audio publishing industry. *Publishing Research Quarterly*, 18(3), 3.

- World Advertising Research Center (2009, June 25). All media is going digital, says Ballmer. Retrieved August 25, 2009 from, <http://www.warc.com/News/TopNews.asp?ID=25320>
- Young, J. R. (2009). How Kindle could change the textbook market. *Chronicle of Higher Education*, 55(36). A4.

## **Appendix A Survey A**

This survey is part one of a longitudinal study researching perception of digital textbooks with a screen reader (audio) option being used for the first time in Nursing Department classes at Union College. Its purpose is to determine initial student perceptions of the digital textbook technology.

A second survey will be administered at the end of the current semester to measure changes in student perceptions of the digital textbook technology.

The information gathered from this survey will remain confidential. The respondent is to complete the form by checking or numbering (as directed) the boxes to answer each question and turn the form in to the class instructor.

## PART 1: Background information.

A1. Rate your previous experience with audiobooks.

Disastrous	Poor	Good	Exceptional	Never Used
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A2. Rate your previous experience with digital textbooks.

Disastrous	Poor	Good	Exceptional	Never Used
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## PART 2: Textbook information

A3. Rate your expectations for the usefulness of your digital textbook for this class?

Very low	Low	Neutral	High	Very high
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A4. Rate your expectations for the usefulness of your textbook's screen reader (audio) option for this class?

Very low	Low	Neutral	High	Very high
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A5. Rate your expected learning potential for this class because of this technology.

Very low	Low	Neutral	High	Very high
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A6. Rate how you expect to use the paper textbook versus the digital textbook for this class.

Paper text only	Mostly paper text	About even	Mostly digital text	Digital text only
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A7. How important is digital textbook technology to you when it comes to improving your grade in this class?

It will hurt my grade	Not at all Important	Somewhat Important	Very Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A8. How important is the screen reader (audio) option to you when it comes to improving your grade in this class?

It will hurt my grade	Not at all Important	Somewhat Important	Very Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



A9. Rank these digital textbook features in order from most useful (1) to least useful (5)

- ☐ Bookmarking
- ☐ Screen reading (Audio)
- ☐ Highlighting
- ☐ Searching
- ☐ Navigation

A10. Will this technology change the way you study?

- |                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |

A11. Would you like to use digital textbooks for other classes?

- |                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |

**PART 3: Demographic information.**

(names and personal information will be kept strictly confidential)

A12. What year in college are you?

- |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Freshman                 | Sophomore                | Junior                   | Senior                   | Other                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

A13. What age group are you in?

- |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 18-24                    | 25-30                    | 31-40                    | 41-55                    | 56+                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

A14. Which class are you in?

- |                          |                          |
|--------------------------|--------------------------|
| Fundamentals             | Med/Surg                 |
| <input type="checkbox"/> | <input type="checkbox"/> |

A15. What type of hardware are you using with your digital textbook?

- |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|
| Laptop                   | Netbook (mini laptop)    | Other                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

A16. If you are using a Netbook with your digital textbook, what brand of Netbook are you using?

---

A17. Please print the last 4 digits of your home phone number

---

## **Appendix B Survey B**

This survey is part two of a longitudinal study researching perception of digital textbooks with a screen reader (audio) option being used for the first time in Nursing Department classes at Union College. Its purpose is to determine changes in student perceptions of the digital textbook technology.

The information gathered from this survey will remain confidential. The respondent is to complete the form by checking or numbering (as directed) the boxes to answer each question and turn the form in to the class instructor.

## PART 1: Textbook information

B3. Rate the usefulness of your digital reference/text book for this class?

Very low	Low	Neutral	High	Very high
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B4. Rate the usefulness of your digital reference/text book's screen reader (audio) option for this class?

Very low	Low	Neutral	High	Very high
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B5. Rate your learning experience in this class because of this technology.

Very low	Low	Neutral	High	Very high
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B6. Describe how much you used the paper book versus the digital book for this class.

Paper text only	Mostly paper text	About even	Mostly digital text	Digital text only
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B7. How important was digital book technology to you when it came to improving your grade in this class?

It hurt my grade	Not at all Important	Somewhat Important	Very Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B8. How important was the screen reader (audio) option to you when it came to improving your grade in this class?

It hurt my grade	Not at all Important	Somewhat Important	Very Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B9. Rank these digital textbook features in order from 1 to 5 (1 being most useful, and 5 being least useful).

<input type="checkbox"/>	Bookmarking
<input type="checkbox"/>	Screen reading (Audio)
<input type="checkbox"/>	Highlighting
<input type="checkbox"/>	Searching
<input type="checkbox"/>	Navigation

B10. Did this technology change the way you study?

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

B11. Would you like to use digital textbooks for other classes?

Yes

☐

No

☐

PART 2: Demographic information.  
(personal information will be kept confidential)

B12. What year in college are you?

Freshman

☐

Sophomore

☐

Junior

☐

Senior

☐

Other

☐

B13. What age group are you in?

18-24

☐

25-30

☐

31-40

☐

41-55

☐

56+

☐

B17. Please explain why you liked/disliked the digital reference/text book for this class.

---

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B18. How could the implementation and use of the digital reference/text book have been more helpful to you?

---

---

---

B19. What difficulties did you encounter adjusting to using a digital reference/text book?

---

---

B20. Did it make the class easier for you, and if so, how?

---

---

B21. What additional comments do you have about the use of a digital reference/text book for this class?

---

---

---

B22. In order to link the answers on this survey to the one you took earlier this semester, please print the last 4 digits of your home phone number

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## Appendix C Informed Consent and IRB Approval Form



COLLEGE OF JOURNALISM AND MASS COMMUNICATIONS  
Advertising

### IRB #

### INFORMED CONSENT

You are invited to participate in a study of college student perceptions regarding digital textbook technology. This study is being done for research purposes. We hope to learn more about how students at Union College feel with regard to using e-book technology in the classroom. You were selected as a possible participant in this study because you are in one of the classes using a digital textbook this semester.

You must be 19 years of age or older to participate in this study. If you are currently 18 years of age or younger, you must opt out of this study. If you decide to participate, you will be asked to complete a two-page survey. This could take up to 15 minutes of your time.

There are no known risks involved with this study. Any information that is obtained in connection with this study is anonymous and will remain confidential. The results of this study will be submitted as the principal part of my University of Nebraska master's thesis. In addition, I plan to make the results available to the Union College Nursing Program faculty in the form of aggregate data, which will not identify specific individuals.

The purpose of this research is to gather evidence about the use of digital textbooks in a college classroom, in particular, how students describe their use of this new technology. Benefits to the students may include expansion of digital textbook technology into additional classes.

Your decision whether or not to participate will not prejudice your future relation with the Union College Nursing Program, the University of Nebraska, or myself. If you decide to participate, you are free to discontinue participation at any time without prejudice.

If you have any questions, please do not hesitate to contact

who will be happy to answer them.

You will be offered a copy of this form to keep.

You are making a decision whether or not to participate. Your signature indicates that you have read the information provided above and have decided to participate. You may withdraw at any time without penalty or loss of benefits to which you may be entitled after signing this form should you choose to discontinue participation in this study.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Investigator

## Appendix D HSRB Approval Form

**Human Subjects Review Board**  
*Approval Notice***Title of Project:**

Student Perceptions of Digital Textbooks with a Screen Reader Function in the Union College Nursing Program

**Principal Investigator:**

Alan Eno

**Consultants or Co-Investigators:**

Debbie Eno, Amy Struthers

**Request submitted by:**

Alan Eno

**Date:**

September 8, 2009

**Action Taken:**

The Board has decided to approve your application pending resubmission of your consent form with adjustments. See addendum.

**Revisions Requested:**

Minor revision of the consent form is requested.

Trudy Holmes-Caines

9-23-2009

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HSRB Chairperson

---

Date:

### Addendum

In relation to the statement “I plan to make the results available to the Union College Nursing program faculty,” please provide additional clarification that would indicate to participants how their confidentiality will be maintained with such action. (I suspect you will provide aggregate data which does not identify specific individuals. If this is the case please indicate.)

### Appendix E Qualitative Data Set

<b>B17: Explain why you liked or disliked the digital reference/text book</b>
I did not have a digital text book or reference book for this class
Well I wouldn't say I disliked or liked it, I'm just neutral to this new resource.
I disliked it because I feel more distracted when I'm on a computer.
didn't use
It didn't ever seem to take me to what I wanted. It seemed like some things were missing. I dislike staring at a computer screen & would rather look at a book.
Harder to get to the information that I needed when using the digital books.
I didn't use it
I did not use digital textbooks
I didn't use the digital text at all. I never had time to put it on my computer and I would much rather use paper text - I don't like reading off the computer screens for a long time.
Did not use it
I didn't like how difficult it is to figure out. I wanted to use it more, but would always become frustrated.
I am used to "traditional" books and have been confused by the process of downloading the ebook version - the only way I could really do it is if we were shown how to in class, rather than just giving us the incentive to make a decision
no response
It was hard to navigate and the looking up process was frustrating and tedious
I didn't really use them because my computer couldn't use the software.
Reading is difficult for me. It's not heavy.
I didn't use it
not used to it
The reference part was helpful in looking up a definition the textbook part I used once or twice and did not care for it
Didn't understand
I like to highlight and hold the book
No prep on how to use it
I didn't know how to use them to benefit me
I prefer not to look/read off a computer screen
I did not use it
no response



<b>B18: How could implementation and use of the book have been more helpful</b>
no response
It could have maybe helped me save time.
It could have made it easier to locate information I was looking for.
for searching easier
For searching for sections/terms. This never seemed to work for me though.
For me it's just easier to flip through a book rather than click next until I find the right page of the right section.
N/A
If I used them
N/A
no response
More helpful tools (like explaining how the highlighting works and bookmarking, etc).
If we actually used the digital ebook in class
no response
Better search and navigation tools
I'm sure it would have been a lot more helpful if I had been able to use them.
If I knew how to use the audio.
It may have helped me complete all of the reading assignments by reading them to me, had I used it.
none
The reference was helpful the text book I did not use
Please don't
I don't think it would be more helpful. I prefer paper books.
If course teacher did a prep, or did assignments that required that
Use an Orientation
Searching for specific material is easier
Not sure
no response

<b>B19: What difficulties did you encounter?</b>
If I had one, it would be having to read off a computer screen
To remember that I had one.
I didn't have any difficulties because I didn't really use the digital reference/text book.
didn't use
I kind of had a bad attitude toward it to start with so when I couldn't get it right away, I dropped it.
My eyes got tired easier, harder to search through.
N/A
I did not use them
I don't like reading computer screens
Didn't encounter b/c didn't try
It was confusing and frustrating. Wouldn't let me highlight.
I don't know how to
no response
Not being able to physically/manually look up was hard
N/A
None
I didn't use it
None
No response
Confusing
I just used my paper text book no digital
Navigation, not textile
I don't know how they can benefit me
no response
I didn't use it
no response

<b>B20: Did it make the class easier for you? How?</b>
NA (the audio part might have made it easier as I could have done other things as I listened.)
No not really
No, I didn't really use the digital reference/text book for the class
didn't use
No
In a way. I was able to bring my laptop to clinicals instead of a bunch of books. However I would have rather had the books.
N/A
No
No
No, didn't use
No
Nope
no response
Somewhat. It reduced the book load
I think that it would have made the class easier. I like the idea of digital textbooks.
Yes, big time. Faster, more efficient, convenient.
I didn't use it
no
No response
Nope
No, made no difference
No
Yes, only online website for reference.
No
No
no response

<b>B21: What additional comments do you have?</b>
There are pros and cons - pros: I've heard it's cheaper, the audio part - Cons: I don't want to always have to carry my computer around.
no response
I feel like I'm more distracted on the computer.
no response
no response
no response
I wish I would've tried it so I didn't have to haul my heavy books all over the place.
None
I don't care to use it
I feel computer stuff is so shaky I just use textbooks
no response
I think it is a fantastic way of ommitting paper and whatnot, but actually have the students come in, make sure they ALL download it and show how to navigate, then decide if it is better. I have no basis in the judgement.
no response
I liked it, but the search tool need to be refined.
Digital textbooks seem like a useful and helpful tool, and I would like to try them someday.
My classmates didn't keep instruction handout so they didn't know how to use it. But I loved it.
I think it can be useful; however, I'm more of a visual kinesthetic version, so the audio part probably wouldn't help me as much as reading like the book would.
none
No response
Do not like
They should not be required but optional
Great idea, hardly any teachers use it.
Teach us how to use it
No response
None
no response